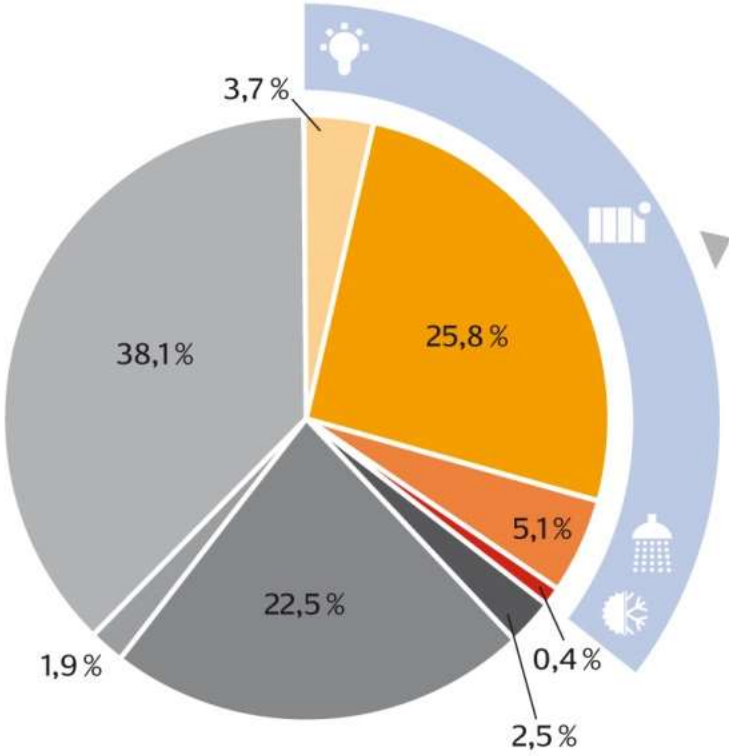
dena
Deutsche Energie-Agentur

dena. German Energy Agency.

Final energy consumption in Germany.

Important impact regarding final energy consumption → Building sector



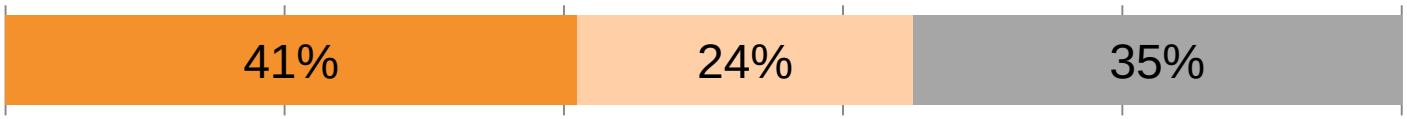
Commercial, public and residential buildings
→ **35 %** of final energy demand
→ 26% for heating → quality of the building envelope!

Energy consumption of the German building stock.

Single/two-family-homes

Multi-family-homes

Non-residential buildings



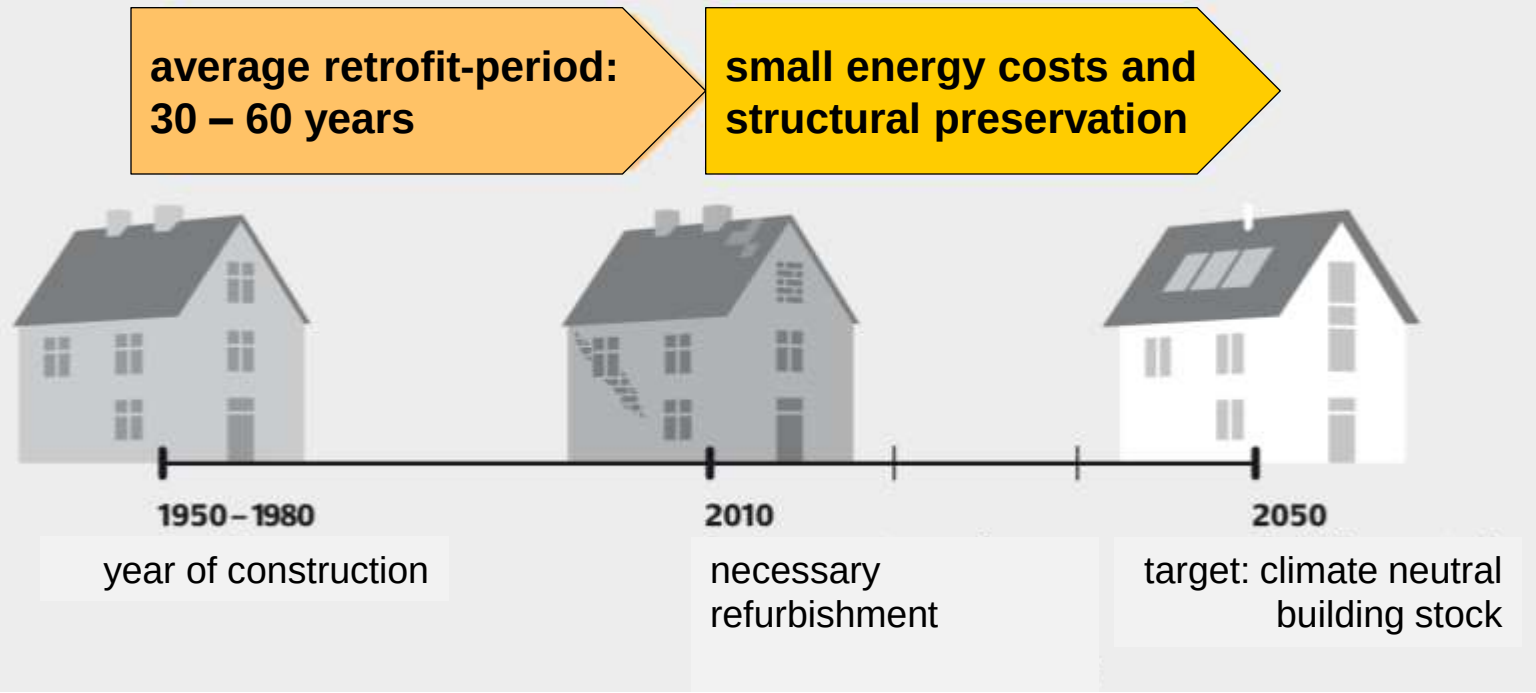
The final energy consuption of the building stock is equivalent to 35% of the total German energy consumption.

Quellen: BBSR, Stat. Bundesamt, Hochrechnung der dena

Period of necessary renovation of buildings.

Use every renovation to save energy!

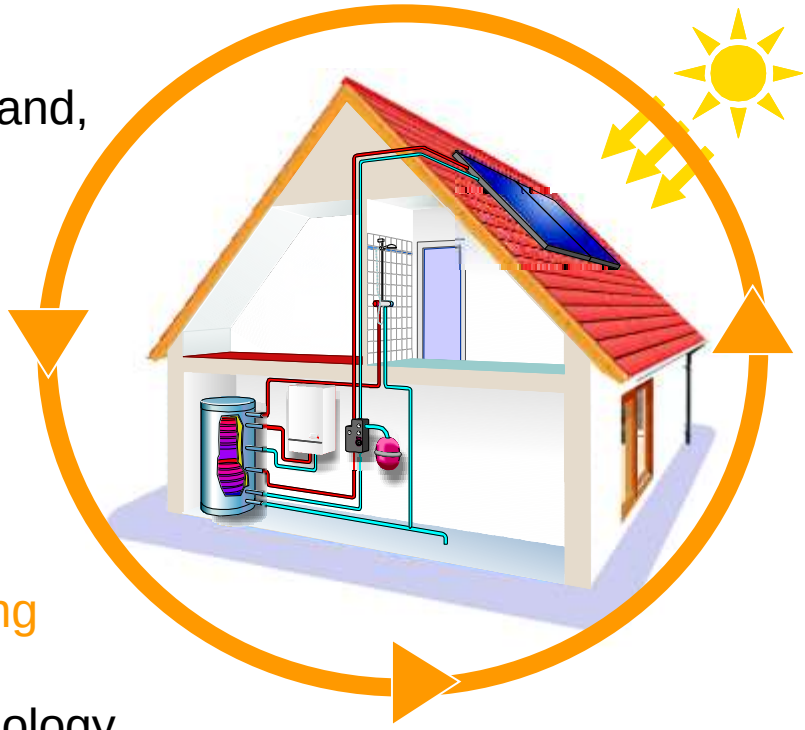
- coupling the energetic measures with the upcoming modernisation and maintenance work leads to the optimal costs of the full renovation



Considering buildings as holistic systems.

Quality of the building envelope

Reducing energy-demand,
optimal insulation,
high-quality windows,
airtight envelope



Usage of renewable energy

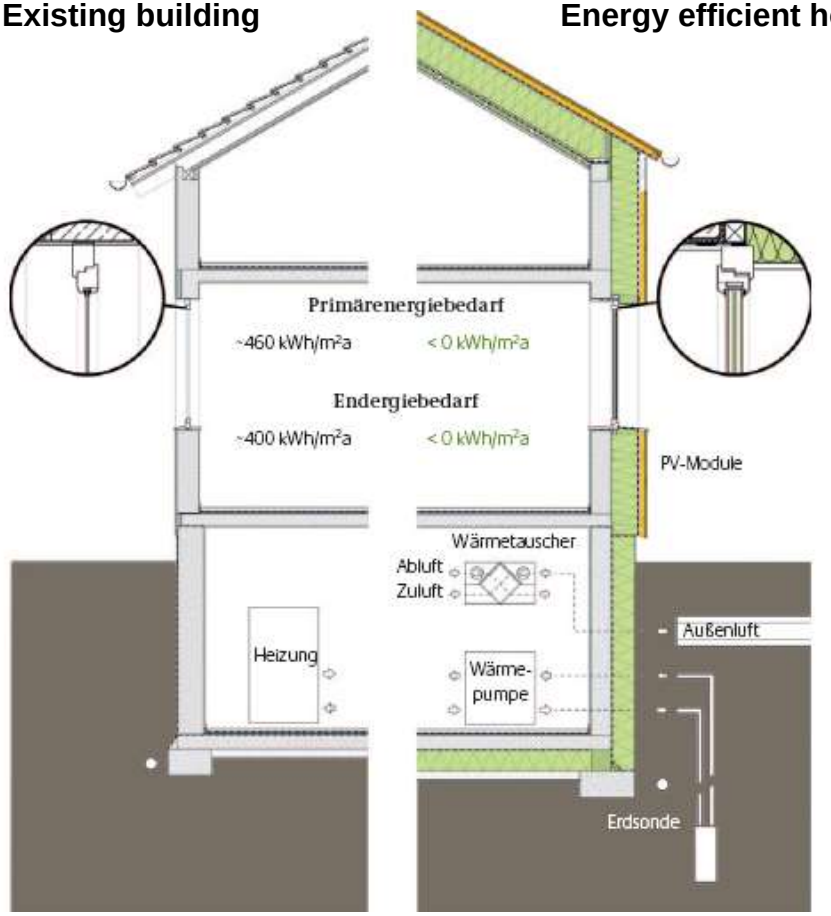
Solar energy
Biomass
Geothermal energy
with heat pump

Energy efficient building services systems

Efficient heating technology and ventilation system with heat recovery

The path: optimised building envelope + building services systems

Existing building **Energy efficient home Plus**



1. Insulated building envelope + thermal bridge-free construction
2. Triple glasing windows (U_W-Value max. 0,8 W/m²K)
3. Airtight building envelope (Blower-Door-Test)

1. Efficient building services systems (heating system + pumps)
2. Ventilation system + heat recovery
3. Renweable energies

Legal Framework in Europe and Germany.

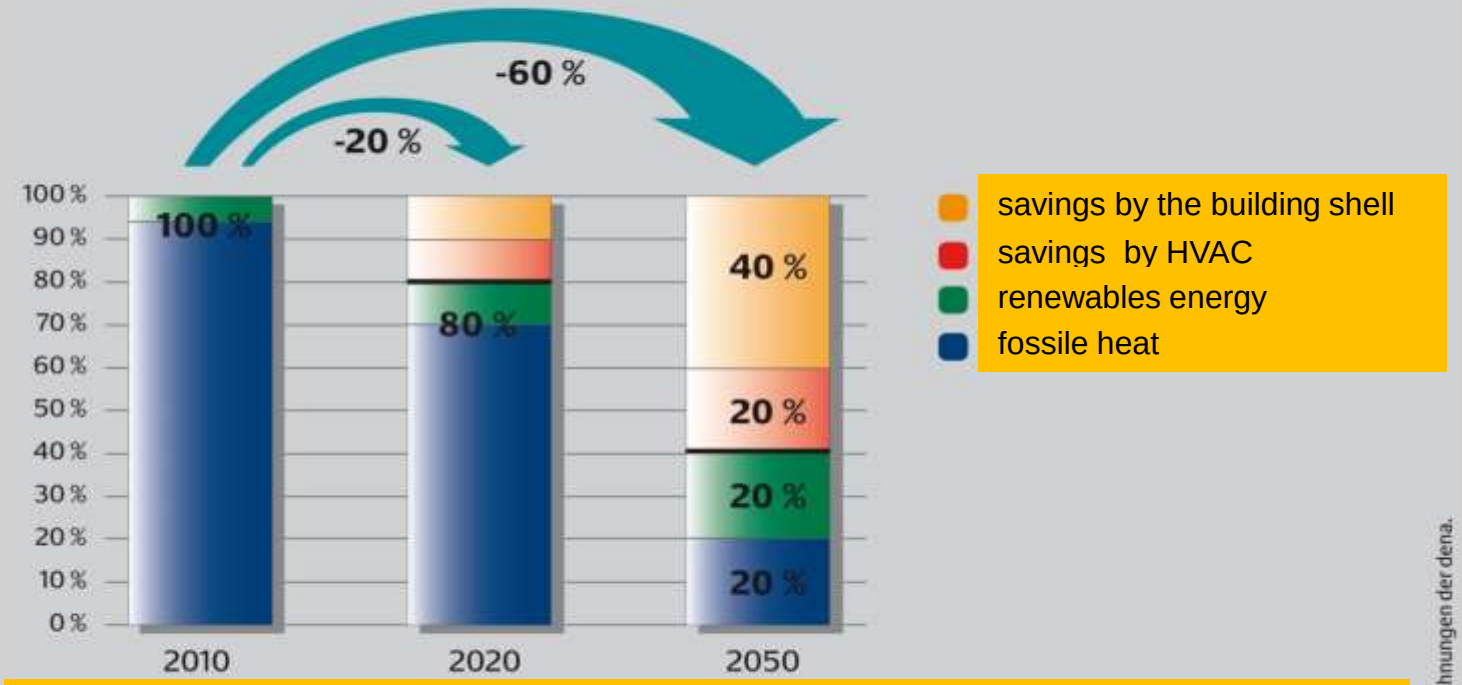
Implementation of New EU Requirements: Recast of the Energy Performance of Buildings Directive.

Requirements of the EPBD recast (2012):

- Increase the share of new and existing "**Nearly Zero Energy Buildings**"
  - By 2021: all new buildings need to be "nearly zero energy buildings"
  - By 2019: All Public Buildings need to reach this quality 2 years earlier.
- Energy Saving Ordinance (EnEV)
  - Implementation of a national independent control system for energy certificates
  - Advancements of the Energy Performance Certificate (**EPC**)
  - Central registers for independent experts

Energy Consumption Scenario.

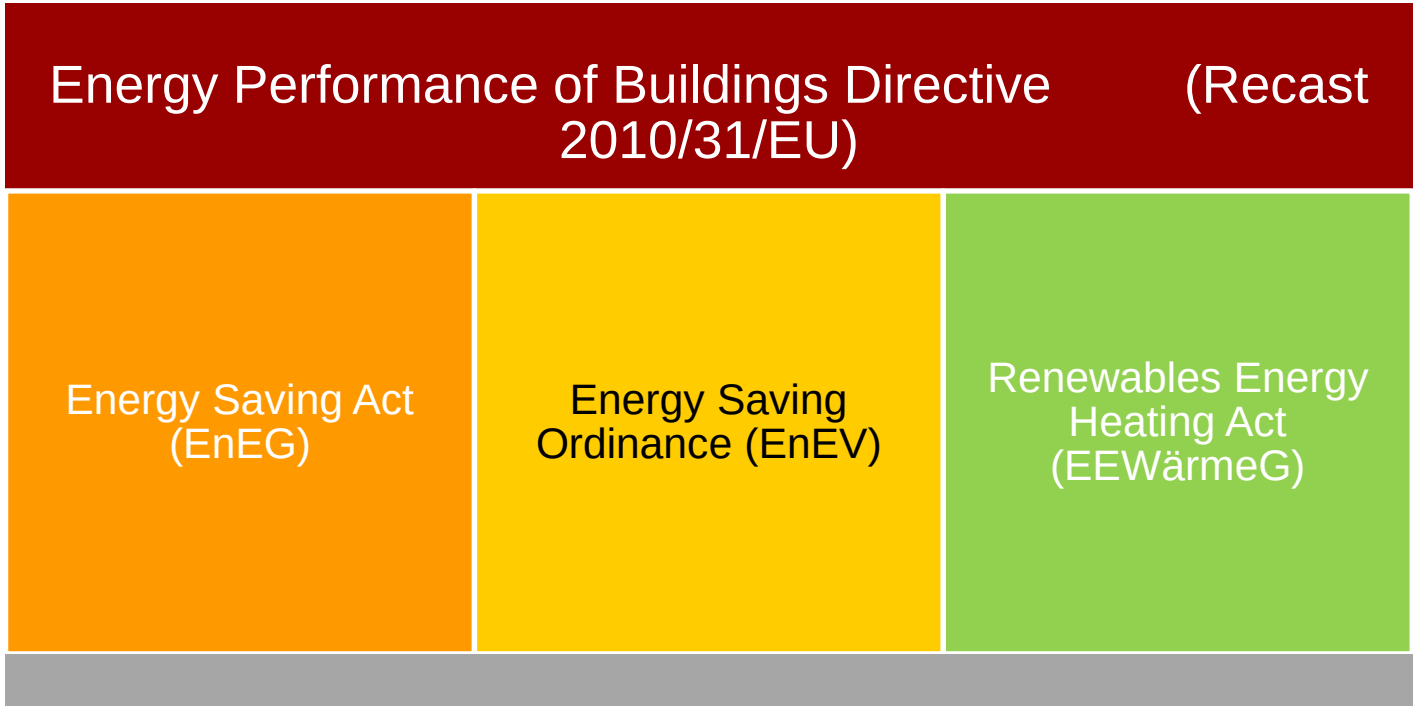
Scenario to achieve the national targets of final energy consumption reduction in the residential building stock in Germany



With **final energy** savings in the residential building stock in Germany up to 2050 by **60%** it is possible to reduce fossile primary energy consumption by **80%.**
The remaining half of final energy will be delivered by renewables.

Quelle: Berechnungen der dena.

Legal framework in Germany.



- Legal enforcement to the Energy Saving Ordinance
- Renewable Heating Act (EWärmeG) in Baden-Württemberg

Renewables Energy Heating Act (EEWärmeG)

- Requirements for new buildings: Partial coverage of heating, cooling from renewable energy sources.
- Requirements for existing public buildings with "a complete renovation"
- Renewable energies and coverage proportions:
  - Geothermal energy, ambient heat → Heat pump (50%)
  - Solar radiation → solar thermal systems (15%)
  - Solid or liquid biomass → bio-oil, pellets, firewood (50%)
  - Gaseous biomass → biogas (30%)
  - Alternative measures
    - Waste heat → air or water floss, heat pumps (50%)
    - combined heat and power plants (50%)
    - Increasing energy efficiency insulation measures →-15% EnEV

Energy Saving Act (EnEG)

- Authorises the federal government to adopt regulations
  - § 1 Energy-saving thermal insulation in buildings to be constructed
  - § 2 Energy saving building services systems
  - § 3 Energy-efficient operation of equipment
  - § 4 Special rules and requirements for existing buildings
  - § 5a Energy performance certificates
  - § 7 Surveillance
  - § 8 Fines

Energy Saving Ordinance (EnEV).

- Sense and purpose: save heating costs reduce greenhouse gases
- Goals and Influence:
  - Sets out thermal insulation standards in new buildings and in refurbishment projects.
  - Defines demands on energy efficiency in new buildings and renovated buildings
  - Using the annual primary energy requirements as well as the thermal insulation of the building envelope
  - Contains the legal basis for energy performance certificates

Energy Saving Ordinance - EnEV 2014.

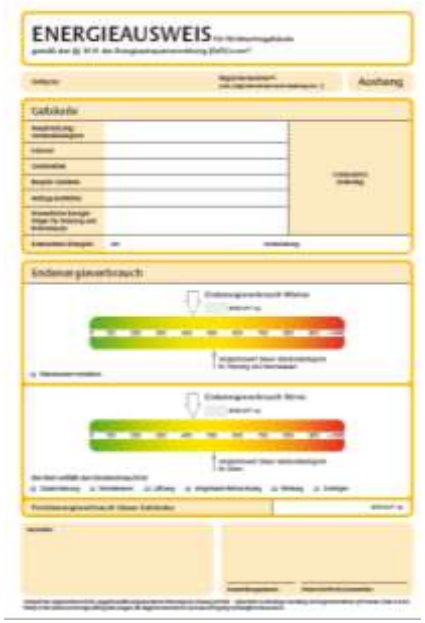
Intensification of energetic requirements.

- Increase of requirements for primary energy use of 25% for new buildings (from 2016).
- Requirements for building-envelope increase of 20%(from 2016).
- Only few requirements for existing buidings, e.g. substitution of heating boilers installed before 1985.
- Decrease of primary energy factor for power to 2,4 and to 1,8 in 2016.
- Obligation for publication of energy perfomance certificates (EPCs).
- For domestic building visualisation the final energy in classes A+ to H
- Control system for EPCs and Air conditioning systems

Energieeffizienz-klasse	Endenergie (kWh/(m² · a)
A+	< 30
A	< 50
B	< 75
C	< 100
D	< 130
E	< 160
F	< 200
G	< 250
H	> 250

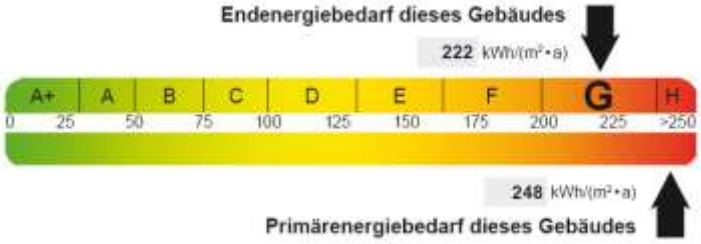
Energy performance certificates (EPC).

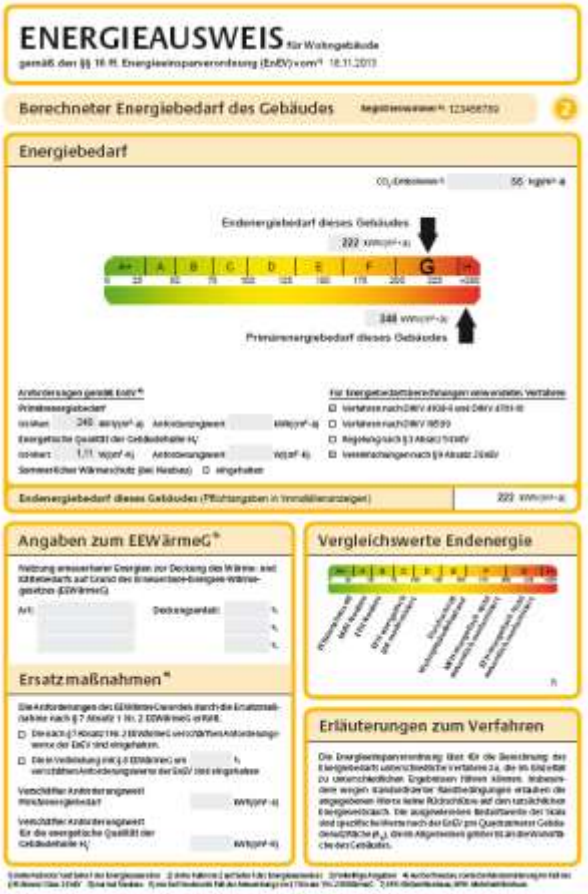
- The introduction of EPCs was required in course of the implementation of the first EPBD
- Main tasks of EPCs:
  - information about the energetic quality of buildings
  - comparison of the energy efficiency with other typical buildings possible.
- When is an EPC necessary?
  - after completion of a new building
  - in correspondence with refurbishment measures or a larger extension
  - with sale or renting of buildings or parts of buildings (e.g. apartments)
  - for display on buildings – with more than 500 m^2 floor space – of public service frequently visited by the public



Energy Performance Certificates (EPC).

- The EPC form
  - Four different certificates are possible
    - (1) energy demand based for residential building
    - (2) energy consumption based for residential building
    - (3) energy demand based for non-residential building
    - (4) energy consumption based for non-residential building
  - EPC contain five pages, additional annex: display for non-residential buildings





Energy Performance Certificates (EPC).

- Calculation basis for the issuance of EPCs

Certificate for	Residential buildings		Non-residential buildings	
New buildings (only demand certiificates)	DIN V 4108-6 DIN V 4701-10 or DIN V 18599		DIN V 18599	Simplified procedure according to appendix 2 EnEV
Existing buildings: Demand certificate	DIN V 4108-6 DIN V 4701-10 or DIN V 18599	Bulletin on the regulations for data acquisition for residential buildings	DIN V 18599	Bulletin on the regulations for data acquisition for non-residential buildings
Existing buildings: Consumption certificate		Bulletin on the regulations for energy consumption values for residential buildings		Bulletin on the regulations for energy consumption values for non-residential buildings

Source: BBSR

Efficiency – our focus.

Thank you.

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